

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of Hikaru OKUBO, Nobuki TANAKA and  
Itaru WATANABE

Serial No.: 10/593,137

Filed: March 16, 2005

For: RESIN COMPOSITION AND SEMICONDUCTOR DEVICE  
PRODUCED BY USING THE SAME

DECLARATION UNDER 37 CFR 1.132

Honorable Commissioner of Patents and Trademarks,  
P. O. Box 1450, Alexandria, VA 22313-1450

Sirs:

I, Ryuichi MURAYAMA, a Japanese citizen, residing at c/o SUMITOMO BAKELITE Co., Ltd. 5-8 Higashishinagawa 2-chome, Shinagawa-ku, Tokyo, 140-0002 Japan, hereby declare and state that I graduated from Nihon University, Department of Industrial Chemistry, College of Science and Technology in 1990, and I also declare that I have been employed by SUMITOMO BAKELITE Co., Ltd. since 1990, and I now engage in Electronic Device Materials Research Laboratory I.

I declare that I have read all of the documents concerning the above-entitled patent application and am familiar with the contents of the present invention in this application.

I further declare that the following experiments were conducted by myself and that the results of the experiments are all true and correct to the best of my own knowledge.

[Experiments]

I hereby submit additional Reference Experiments 1 and 2 to demonstrate that the adhesion strength, warpage and reflow resistance as obtained by the composition of the present invention are not obtained even though the maleimide compound of Sakurai is used for the resin composition of Herr et al.

In Reference Experiments 1 and 2, the bismaleimide compound (g) or (h) used in Examples of Sakurai is used for the resin composition of Example AA of Herr et al., in place of the liquid bismaleimide of Example B. "XD0026" used for the resin composition of Example AA is a company secret and unclear, so that it is not used in Reference Experiments 1 and 2. In these experiments, therefore, the amount of components excluding XD0026 are decided so that the total amount of

the components excluding XD0026 is 100% and the ratio of each component is the same as that of Herr et al. (excluding XD0026). The compositions of the resin compositions of Reference Experiments 1 and 2 are shown in the table below.

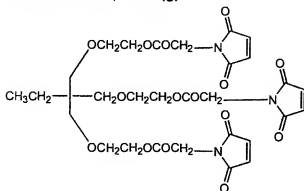
Reference Experiments 1 and 2 were conducted in the same manner as Example Series E described in the Specification of the present invention. In particular, the resin compositions having the compositions shown in the table below were evaluated in the same method as Example Series E. In Example Series E, resin compositions corresponding to the resin compositions of Claims 23 to 25 of the subject application were evaluated. The results of Reference Experiments 1 and 2 are shown in the table below.

It is clear from the results that in the case of using the maleimide compound for the resin composition of Herr et al, which was used in Examples of Sakurai and has a structure that is considered not preferable in the present invention (a trifunctional structure or a structure having an aromatic ring other than an imide ring), among the evaluation items shown in Table 5 of the Specification of the subject application, poor results were obtained in all of the following three items: adhesion strength 1, warpage and reflow resistance.

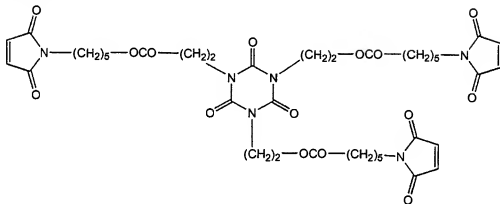
A reason why such poor results shown in the table below were obtained is estimated as follows: the resin compositions of Reference Experiments 1 and 2 have very high viscosity, show poor coating performance, and show poor adhesion performance to a bonding surface (Ag-plated surface). Also, it is considered as a reason for the poor results that both of the resin compositions of Reference Experiments 1 and 2 show low flexibility after curing and low expansion when heated, etc., so that the degree of thermal expansion of the resin compositions are very different from that of the bonding surface.

It has been proved by the above results that excellent adhesion strength, warpage and reflow resistance as those of the subject application are not obtained even though the maleimide compound used in Examples of Sakurai is used for the resin composition of Herr et al.

**Maleimide compound (g):**



**Maleimide compound (h):**



		Reference Example 1	Reference Example 2
Components (wt%)	Maleimide compound (g)	8.8	-
	Maleimide compound (h)	-	8.8
	Dimer acid vinyl ester	8.8	8.8
	Ricon 131 MA20	2.2	2.2
	Methacryl silane CA	0.1	0.1
	Peroxide	0.3	0.3
	XD0026	0.0	0.0
	SF96	79.6	79.6
Evaluation	Adhesion strength 1	35.0	25.0
	Adhesion strength 2	65.0	67.0
	Warpage	<20	<20
	Reflow resistance	100	100
	Comprehensive evaluation	x (Poor)	x (Poor)

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated this 12 day of June, 2011

Ryuichi Murayama

Ryuichi MURAYAMA